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ABSTRACT

The goals of the Fourth Annual Aspen Institute Roundtable on International Telecommunications were: to address procedural and substantive solutions for international coordination of Internet policy issues; to suggest different models for dispute resolution and policy coordination that might be employed in the various contexts of Internet usage; and to consider where coordination of policies is advisable and where it might not be. The first section of this report presents the introductory comments by the participants as they worked to frame the issues for the roundtable. The findings of the following three working groups constitute the main body of the report: (1) Emerging Network and Enhanced Network Functionality, including local broadband access, the impact of legacy systems, lack of effective mechanisms to discuss global Internet-related policy issues that need clear resolution, other barriers, and recommendations for action; (2) Commercial Transactions and Electronic Commerce, including objectives of electronic commerce and recommendations for action; and (3) Content and Cultural Values, including basic principles, recommendations for action, content access, electronic public access, privacy, and intellectual property. A list of conference participants is appended. (MES)

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The Internet and Global Telecommunications

Exploring the Boundaries of International Coordination

A Report of The Fourth Annual Aspen Institute Roundtable on International Telecommunications

Michael J. Kleeman, Rapporteur

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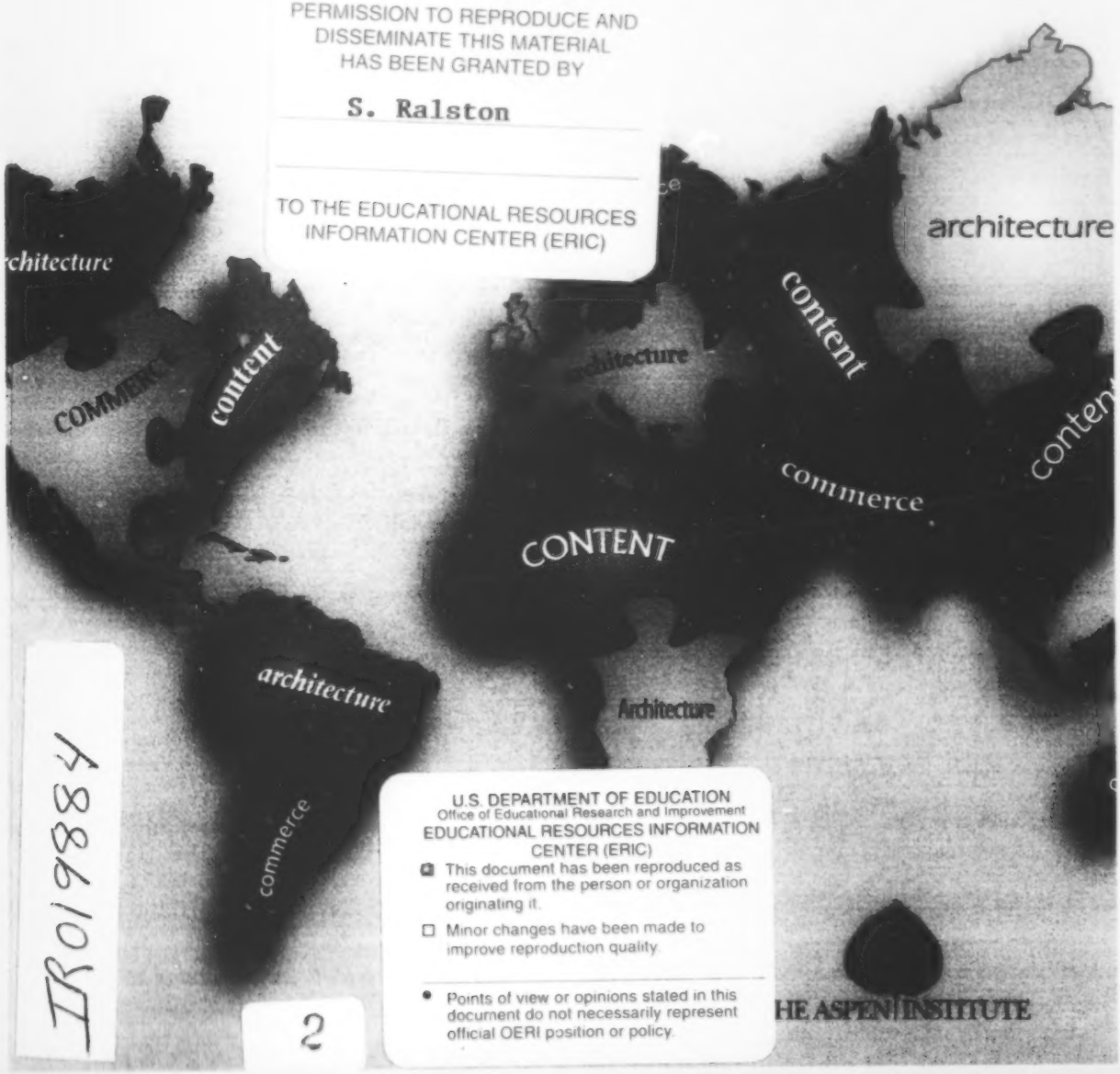

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The Internet and Global Telecommunications

Exploring the Boundaries of International Coordination

A Report of The Fourth Annual
Aspen Institute Roundtable
on International Telecommunications

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Rapporteur

THE ASPEN INSTITUTE
Communications and Society Program
Charles M. Firestone
Executive Director
Washington, DC
1999

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Foreword

Over the past five to ten years, numerous changes and innovations in the communications industry, particularly in the staid and steady world of international telecommunications, have raised questions about the suitability of regulating and governing global networks in accordance with old models. Until just a few years ago, state-owned telephone companies controlled national consumer bases of their respective countries through their monopoly carriers. Today, telecommunications companies compete globally for clientele through a largely privatized, liberalized regime. New technologies pose another fundamental challenge to traditional forms of telecommunications governance by enabling users to bypass imbedded communications networks.

One particular technology, the Internet, presents unique challenges to regulators of global telecommunications. As the Internet has emerged—from a non-regulated, localized experiment of the U.S. Department of Defense to a ubiquitous global network upon which millions of people rely to conduct professional transactions and personal communications—new approaches to law, regulation, and government involvement in the communications sector may be necessary.

In the early years of the Internet, the governance of physical and electronic communities was virtually identical. In both cases, nations handed down rules to govern their sovereign territories. As the Internet grew, drawing boundaries around electronic jurisdictions became more difficult. The blurring and occasional confluence of jurisdictions has made Internet governance extremely challenging to national policymakers. So too have the expectations of cyberspace netizens for a representative, participatory model of governance that reflects users' unique needs.

In the Internet's youth, most of its content was developed and consumed in the United States. Therefore, American private and public officials took the lead in coordinating key Internet functions, such as managing domain names. However, as the network expanded internationally, the absence of key international stakeholders became apparent. There is a growing need to expand the

circle of Internet policymakers to involve key stakeholders, traditionally excluded from the policymaking process, who represent the diverse backgrounds of the electronic community. The first step toward the globalization of Internet governance was taken with the transition of authority to manage the domain name system from the Internet Assigned Numbers Authority (IANA) to The Internet Corporation for Assigned Names and Numbers (ICANN). This transition and the underlying process through which it was facilitated (the International Forum on the White Paper) are instructive broad-based alternatives to traditional models of Internet governance.

In this context, The Aspen Institute Communications and Society Program convened the Fourth Annual Aspen Institute Roundtable on International Telecommunications, September 21–24, 1998, at the Shonan Village Center in Japan, to address these important issues of Internet governance. The meeting brought together policymakers and business leaders from Europe, the United States, and Asia to address appropriate roles for the public and private sectors in coordinating decisions on Internet network architecture, commercial transactions, and content regulation. The discussion on architecture considered the possible creation of an international mechanism to expedite technical solutions and standards. The discussion on commercial transactions explored the necessary legal and institutional preconditions to support the expansion of electronic commerce. On the topics of culture and content, participants discussed the importance of the Internet in promoting educational and cultural values. In their discussion of issues such as privacy, certification, and electronic public access, the group advocated non-governmental solutions wherever possible.

On the larger governance issue, participants' discussion mirrored the larger international debate as to whether Internet governance should be primarily governmentally controlled, privately led, or left to its own devices. In sum, conference participants largely concluded that private and public sector participation in Internet governance was critical, and that greater international coordination on technical governance issues was necessary. Possible vehicles for such coordination include three alternatives:

an existing institution, an international charter, or a new organization entirely. The following report delves into these models as a starting point for an international dialogue on the issue.

One benefit of strengthened international coordination of the Internet is to clarify permissible conduct across jurisdictions. Many participants were concerned that existing discrepancies in legal and regulatory frameworks of the Internet—both within nations and across national borders—enable companies or individuals to dodge the rules of certain communities and to "shop around" for jurisdictions with less restrictive laws or more lenient enforcement. While participants stopped short of advocating government regulation of the Internet, they suggested that governments may have an obligation to provide for the well being of their communities by addressing this "race to the bottom." Moreover, as the Internet continues to grow in size and importance, strengthened international coordination on Internet issues is fundamental to maintain a stable, reliable, and safe electronic environment for a growing community of global users.

Aspen Institute Roundtable on International Telecommunications

The first AIRIT was convened July 26-30, 1995, in Aspen, Colorado to reconcile conflicting European, American, and Asian perspectives on the emerging global information infrastructure. Competition, regulation, and social policy factored largely into the discussion. The second AIRIT, convened June 19-22, 1996, in Berlin, Germany, focused on the need to develop regulatory policies to support the development of mutltimedia services. The debate explored the impact of multimedia services on the Internet, and vice-versa. In the third forum, participants continued their discussion of how changing circumstances—at the political, institutional, economic, and technological levels—affect the international telecommunications landscape. Central to this meeting were discussions of the World Trade Organization, the General Agreement on Trade in Services, and the shift toward a competitive global framework for telecommunications services. With this, its fourth iteration, AIRIT addressed how the emergence of the Internet might impact the formerly finite, orderly, regulated world of international telecommunications.

Acknowledgments

There are numerous individuals whose commitment of time, intellect, and resources have made the Fourth Annual Aspen Institute Roundtable on International Telecommunications possible. First, we gratefully acknowledge the participants in the Fourth Annual meeting, whose names are listed in the Appendix to this report, for their time and energy at the conference and for their follow-up afterward. We extend special thanks to the sponsors of this Roundtable: Bell Atlantic, British Telecommunications, Daimler-Benz InterServices, EDS, GTE, ICG/Netcom, Nippon Telegraph and Telephone, Nortel Networks, and the Research Institute of Telecommunications and Economics–Japan.

We thank our rapporteur, Michael Kleeman, for his thoughtful commentary and interesting conference report. Additionally, we thank Beth Wachs, program associate, and Patricia Kelly, senior program coordinator, for their assistance in coordinating the conference and producing this report. Also on the production end, we thank Sunny Sana, program coordinator; Rebecca Weaver, publications manager; Tyler Stone, graphic design specialist; and David Stearman, copy editor for their help in editing, proofing, designing, and producing the final report.

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The Internet and Global Telecommunications

Introduction

The Internet is a driving force in global communications and commerce; as such, issues related to its governance and growth have broad implications that reach beyond those of traditional telecommunications services or networks. Unlike prior communications networks that carried primarily voice traffic, the Internet collects and distributes content and facilitates global and local/national commerce—which raises two types of questions: What purposes does the network serve for users? What barriers prevent or constrain such use?

To address these questions and to explore issues more broadly related to international coordination of the Internet, the Aspen Institute convened the Fourth Annual Aspen Institute Roundtable on International Telecommunications September 21–24, 1998, at the Shonan Village Center in Japan. Given the dynamics of the Internet environment and the range of stakeholders interested in the outcome, the scope of issues facing the participants was broad. The goals of the conference, prepared before the meetings, reflected this breadth:

- To address procedural and substantive solutions for international coordination of Internet policy issues;
- To suggest different models for dispute resolution and policy coordination that might be employed in the various contexts of Internet usage; and
- To consider where coordination of policies is advisable and where it might not be, specifically:

    1. To consider a range of mechanisms that facilitate equitable participation in Internet governance, assure network reliability and enhanced capabilities at affordable costs, provide necessary safeguards for electronic commercial transactions, and are sensitive to local cultural values;

2. To explore the spectrum of appropriate processes, forums, public- and private-sector roles, and dispute mechanisms; and
3. To suggest how different contexts might warrant different approaches—such as self-regulation, laissez-faire, mutual recognition of national policies, international coordination or regional laws, or binding international agreements.

As the agenda and proceedings make clear, the world of the Internet is both similar to and quite unlike other the areas of communications, media, and commerce that it affects. In the world of commerce, the Internet is a new and different channel, although existing regulations and policies can be adapted to help address many of our needs. In the technology area, the Internet is profoundly different from what proceeded it; moreover, because it has developed at the same time as multinational and global carriers that transcend national boundaries and the technological revolution spawned by computers and fiber optics, existing rules barely relate or apply. In the world of media, the Internet is an uncontrolled channel with vast potential and corresponding complications. Thus, many of the recommendations coming out of the Roundtable involve suggestions that we extend existing capabilities and rules into this space; others acknowledge that the underlying phenomenon is quite different and the approaches we take need to be adapted to this new model.

The three-day roundtable comprised two distinct formats: plenary sessions and working groups. Plenary sessions convened all conference participants to participate in broad discussions and to finalize recommendations of smaller working groups. These recommendations were prepared in discussions within three working groups, which focused on key areas of the Roundtable. Each of the participants belonged to one of the following working groups:

- The Emerging Network and Enhanced Network Functionality;
- Commercial Transactions and Electronic Commerce (e-commerce); and
- Content and Cultural Values.

A list of participants and their affiliations at the time of the Roundtable appears in the Appendix.

Organization of the Report

The perspectives and recommendations of the three working groups constitute the main body of this report. Like previous rapporteurs faced with the task of digesting, integrating, organizing, and presenting the thoughtful and heartfelt contributions of numerous globally-experienced professionals, I know I come up short. For the sake of readability and digestibility, the report represents my synthesis combined with insights from various participants.

Before proceeding to the working group discussions, however, this report briefly explores the richness of the discussion throughout the three days. This preliminary section presents the introductory comments by the participants as they worked to frame the issues for the coming days and add dimension to the published goals of the conference.

There were numerous dimensions of the dialogue about the Internet—from standards and operational concerns raised by the move from circuit- to packet-switched environments to the cultural impacts of this emerging medium. These and other issues highlight the real force of this new form of network communications and its profound impact on our society. Likewise, the discussions displayed a rich understanding of the issues (and workable solutions) that need to be addressed to help ensure a greater social good from this revolution.

General Discussions

Roundtable participants generally acknowledged that the Internet, as it is evolving, will have major impacts in a wide range of human activity and will fundamentally alter many sectors of the economy.[1] The group recognized that the Internet will likely become the primary means of interpersonal and content communications in the future.

With this background, two polar perspectives framed the discussion. These perspectives can best be described as the "Darwinian" or *laissez-faire* approach ("Let'er rip; get out of the way and resolve problems later") versus the planning approach

("Anticipate and plan for problems and resolve them up front"). The participants did not advocate either of these perspectives completely; the group acknowledged the complexity and uncertainty of the environment.

For example, George Yong-Boon Yeo, minister for Information and the Arts in Singapore, neatly merged the two polar views through his observation that the Internet was and probably will continue to be governed by a Darwinian adaptation within traditional commercial and political governance structures. Participants explored the merits of this insight by considering the role of government. In their quest to determine whether the two views are reconcilable, participants explored the parameters of possible appropriate roles for governments and existing international institutions in coordinating the Internet (e.g., minimum norm setting and dispute resolution). Likewise, they considered circumstances in which it would be appropriate for these actors to step back and let others lead. As William Poulos, director of electronic commerce policy for EDS, rhetorically argued, "Why should private industry be left out in the hallway while governments duke it out?" Participants concluded that it may be time to turn over some of the regulatory functions traditionally performed by governments to other stakeholders. For functions that governments or international agencies wish to retain, Juzar Motiwalla, CEO of the Kent Ridge Digital Labs in Singapore, suggested a new approach: governments should keep "scorecards" rather than serving as "watchdogs." On the whole, a model entailing a careful balancing of the two approaches applied to specific issues at hand began to emerge throughout the meeting.

The Darwinian perspective espoused by much of the traditional Internet community provided a basis for much early discussion.[2] Wally Baer, senior policy analyst at the Rand Corporation, observed that natural selection and adaptation take time; the Internet, however, is driving rapid and dynamic change, with some winners and many losers—and thus is not an environment for orderly change (which governments and regulators prefer). Baer also observed that the Internet has not yet really moved into the mainstream, so its real impacts have yet to be felt.

The newness of the Internet as an economic force and thus of interest to regulators was emphasized by Lee Tuthill, counselor to the trade in services division at the World Trade Organization (WTO). Tuthill reminded the group that until very recently few, if any, regulators were concerned with the Internet per se (largely because its impact has not been apparent until the past few years). That lack of regulatory oversight and appropriate restraint over dominant Internet Service Providers (ISPs) or incumbent monopoly telecommunications carriers moving into the Internet ultimately may harm the growth of the industry and the health of many providers. Tuthill cited peering interconnection and economics as one key area of concern.

Herbert Ungerer, head of telecommunications, postal services, and information society issues in Directorate General IV of the European Commission (EC), noted that the Internet still carries less than one percent of total global traffic, although the numbers are changing rapidly—and soon the Internet "will lose its innocence." The industry is in a period of change, and the speed of change may outstrip the ability of traditional institutions to do anything but plan a little and follow quickly.

Andrew Shapiro, director of the Aspen Institute Internet Policy Project, raised the issue of jurisdiction in international commerce: How does one protect the interests of consumers in this world, while permitting firms to conduct their business and innovate in new global markets? Shapiro suggested that some traditional rules and mechanisms may be applicable to the new space—especially in the area of electronic commerce, which largely operates the same as traditional commerce despite the new channel. He asserted that years of international dialogue on commercial matters remain largely relevant in the Internet environment.

Tuthill reinforced Shapiro's point, suggesting that traditional transborder commercial transactions raise many of the same issues that Internet e-commerce raises—and the rules of the "old" world might be relevant. Michael Niebel, deputy head of the cabinet of Mr. Martin Bangemann of the EC, echoed this view, asking if a new set of rules were really needed to deal with the emerging Internet world. Technology can alter relationships, economics, and functionality; institutions need to understand how to respond

to these changes. The context must be clear, however: What is the goal of the intended changes to this emergent environment?

Several participants raised identity and authentication concerns.[3] In the Internet environment, how does one really know who one's correspondent is? Jun Okayama, director of the trunk communications division of the Japanese Ministry of Posts and Telecommunications (MPT), observed that consumers often use traditional media (in his example, print media advertising) to authenticate Internet site identities If the entire transaction is electronic, how does one know who is on the other end? This quandary raises issues of trust and the relationship of the Internet to traditional media. It also reflects the fact that traditional media such as television, print, and billboards are the primary advertising media for many Internet portal or e-commerce sites such as Yahoo and Amazon.com.

Okayama also raised the common parental concern regarding the ease of content access and the need to filter certain types of content from minors or unintended viewers. He suggested that the critical aspect isn't mere availability but the ease of access ("just two mouse-clicks away").[4] The issue of trust and undesirable content came together in a comment by Robert Pepper, chief of the Office of Plans and Policy of the Federal Communications Commission (FCC), who observed that going to *www.whitehouse.gov* brings the user to the home page of the executive branch of the U.S. government—but *www.whitehouse.com* (many users assume that all sites end in *.com*) brings up a pornography site.

Hiroshi Kometa, director of the Global Multimedia Business Division of the Japanese carrier, Nippon Telegraph and Telephone Corporation (NTT), raised the question of economic equity for carriers and ISPs (an increasingly visible issue both within and recently outside the carrier community). Because of the Internet's relative youth as a commercial environment, its traffic patterns and underlying economics are still emerging. The Internet began as a U.S.-based network; early traffic flows were U.S.-centric, and the United States remains a locus of control over the Internet, with U.S.-based carriers exercising significant economic control over international access. Kometa discussed

the equity of current peering and international trunking arrangements and the implicit settlements to U.S. carriers under such arrangements. As the network matures, these arrangements may not remain stable or appropriate.

Leland Schmidt, vice president of Industry Affairs for GTE Telephone Operations, emphasized the shifting economic environment for providers. Schmidt noted that all Internet issues are global in nature; moreover, from the perspective of a traditional carrier [such as a Public Telecommunications Operator (PTO)], the circuit versus packet question raises complex issues in regulatory policy and investment decision making. In the era characterized by traditional regulation and the dominance of circuit-switched technology, investments were based on a combination of proven and stable technologies, predictable product demand characteristics, and a monopoly service supplier with controlled depreciation and fixed returns on investment. In the Internet environment, investments need to be made in a competitive space, with unproven technologies, while demand grows and changes almost unpredictably.

This shift in the economics of the communications industry can place incumbents with massive fixed assets at a disadvantage relative to newer and more agile competitors. In the United States, for instance, new entrants can lease access loops at long-term marginal cost and then add digital subscriber line (xDSL) electronics to provide high-speed Internet access service. An incumbent charged with universal service demands and a mix of technologies must attempt to compete with focused new entrants that can leverage their competitors' assets at the lowest possible cost. Schmidt's view, formed from the dualistic perspective of a traditional carrier that now owns one of the founding firms of the Internet (BBN), is that extending the logic of traditional ("circuit-based") regulation to the new environment—simply because there is a perceived vacuum—would be a mistake; the converged world requires a converged view of policy.

Various participants agreed with Schmidt about the need for a converged view of policy in today's changing environment. For example, Motiwalla explained that whereas one can create new businesses in the Internet community of today, emerging tech-

nologies—especially broadband—will alter the future of commerce and content and effect the type of business that will be formed (and by whom). Likewise, Izumi Aizu, principal of Asia Network Research, reminded the group that the Internet is still both private and public, further complicating the question of regulation.

The changing technology of the Internet alters many of the economic rules in telecommunications, a multi-hundred-billion dollar industry. Many of the incumbent players are major beneficiaries of the Internet (for leased lines, telephone lines for dial-up access, and other traditional services which support Internet access and transmission). It is not surprising that equity will mean different things to different people in the industry. It has become clear that the future will be a packet world, with lower capital and operating costs. Making the transition from the current technical environment to the promised future will be complex, with many of the parts still missing.

Several participants raised the theme of tensions between global commerce and national or local cultural interests. Jeremy Beale, policy analyst and administrator of the Organization for Economic Cooperation and Development (OECD), explicitly discussed the regulatory and policy issues for governments of new content services on the Internet: How does one deal with intellectual property in this new environment or the rights of a community to screen the content coming in via the network?

Participants also discussed the impact of this new medium and its potential power to influence cultures. Yeo touched on the theme of protecting cultural identity; he expressed the belief that although the Internet can threaten local cultures, it also can be a force for preserving and extending local culture—*if* it is part of a national or community-based plan. Motiwalla also noted the potential of the Internet, especially in the broadband environment, where rich content can alter many forms of human commerce, from health care to entertainment.

These discussions reflected the goals of the Roundtable and the experience and perspectives of the participants. No one expected simple answers—or even simple questions. Participants were reminded of the richness of the issues and the need to address

them in a constructive and creative manner. Charles Firestone, executive director of the Aspen Institute Communications and Society Program, concluded the initial discussion by reminding the group that the Aspen Roundtables seek to rationalize different views and demands and achieve a best answer to the problems at hand. The working groups were formed with this challenge in mind.

As a case study in Internet governance and the complexity of working in a changing landscape, Izumi presented his organization's experience with the International Forum on the White Paper (IFWP). The IFWP—an international ad hoc coalition of professional, trade and educational associations that represent a diversity of Internet stakeholder groups—came together to discuss the transition to private sector management of the technical administration of Internet names and numbers. The Internet Assigned Numbers Authority (IANA) previously had the exclusive authority to assign Internet address names (such as *www.aspeninstitute.org*), which represent the equivalent of telephone numbers in today's voice network. Historically, the IANA function was controlled by a single (U.S.-based) organization; as the Internet grows, additional name authority organizations became desirable.

According to Izumi, the success of the IFWP process, particularly the Singapore meeting, illustrated the need for a forum with true "global" participation and representation. He therefore suggested that a new mechanism, or at least a regular forum, might be very effective. There is conflict, however, between the desire for greater non-U.S. control over what is increasingly a global resource and the need for functional control (to avoid duplicate names and formalize naming policies). This issue is further complicated by the enormous economic value at stake. The original name authority organization has a market value of more than $3 billion, largely because of its monopoly position in the Internet.

The IANA transition process, which is still being resolved, has been one of the first Internet policy issues to undergo multinational policy consideration and as such is a key test case. This transition has struggled with balancing multiple interests, techni-

cal requirements, procedures for selection of providers, and major financial considerations. The Roundtable addressed only a small sample of the range of issues to be faced in future Internet governance discussions.

The Working Groups: Issues and Recommendations

The working groups were formed with broad representation from the different backgrounds of the Roundtable participants. The working groups identified key issues and then framed recommendations for resolution of these issues, drawing on the public and private sectors. The following sections examine the working groups' issues and recommendations, and how they endeavored to resolve the issues raised at the outset of the Roundtable.

Working Group on the Emerging Network and Enhanced Network Functionality

The Internet is not an isolated technological phenomenon. It evolved from early packet-switched data networks, and its growth has been fueled by the dual drivers of the microprocessor and optical transmission technologies. Despite all of the excitement regarding the Internet, however, it is still a small piece of the overall global network—loosely organized among hundreds of carriers, relatively inefficient and yet highly robust. This situation is much as the network's early designers planned and is a testament to their vision.

In the future, however, the Internet will require new capabilities as it is expected to support all forms of communications traffic on a "converged" network. Indeed, this vision of a single integrated network has driven more $20 billion in investment in the United States and Europe on next-generation networks. Will this future network work as desired? What will need to change to accommodate this future mission? What kinds of inter-organizational cooperation will be required to move complex traffic types between carriers and nations to meet customer needs in the broadband world? These questions were some of the issues facing the working group as its members began their discussions.

The working group identified four primary barriers to the growth, development, and use of the Internet in terms of network functionality. These barriers then framed the group's recommendations.

Local Broadband Access

The lack of local broadband access was identified as one of the greatest barriers to future Internet development. The slow pace of standardization for new technologies such as cable and digital subscriber line (xDSL) modems is an example of the constraints in this area, as are historic capital allocation processes within incumbent telecommunications carriers and cable television (CATV) networks. The existing pricing structure of the incumbent telephone companies hinders the rapid deployment of such new high-speed services. For example, even where low-price xDSL services are technologically feasible, incumbents are reluctant to offer them because they are afraid to lose more expensive leased line services in the same bandwidth range. In other words, "cannibalization" among telecommunications carriers is becoming a barrier.

Some U.S. carriers have addressed this issue by de-tuning their xDSL service (providing lower-speed services that meet customer needs but do not maximize the potential of the technology) or providing xDSL only as a bundle with Internet access service—and not providing voice services over these circuits. Interestingly, from a policy perspective, the carriers made these moves only after CATV providers began to aggressively offer cable modems or after competitive local access providers (CLECs) began to utilize xDSL and price it aggressively to drive adoption. It is also important to note that competitors are increasingly challenging such bundling.

As Motiwalla noted, however, the broadband environment is qualitatively different one from the narrowband world of dial-up modems. Until increased broadband access is available,[5] the promise of a multimedia Internet with support for educational, medical, and entertainment video; two-way video conferencing; and other converged services will remain unfulfilled. Current trials suggest that once this capacity is available, the products and services provided over this high-speed dedicated channel will be exciting and hard to predict from today's Internet.

Impact of Legacy Systems

The second type of barrier is the remaining impact of legacy systems, including regulatory policies and other frameworks that

were designed and implemented in the age of circuit-switched technology and services in typically monopoly regimes. Even the notion of "universal service" for telephony may now act as a barrier for the development of the Internet.

The "telco-mentality" of slow, large-scale, well-planned deployment of public-switched networks is another example of this kind of barrier. In a monopoly environment with clear goals (universal service of high quality for switched voice services) and predictable traffic flows, such long-term, planned deployment was an appropriate way to allocate capital and focus on achieving social goals. In the dynamic world of the Internet—with its leveraging of the existing network, competitive network providers, support for multiple products, rapidly changing requirements, and unpredictable traffic flows[6]—the old capital allocation rules do not work. New, more adaptive rules are needed. Likewise, a focus on the adoption of single technological solutions such as fiber-optic cable instead of an exploration of various alternative access technologies (such as xDSL, radio-based systems, and even satellite technology) is a potential barrier to the economic growth of the new Internet.

The working group also noted that the lack of a clear and equitable policy framework for interconnection/exchange/peering of different ISPs at the local, national, regional, or international level has become a potential bottleneck for network growth. This barrier involves two problems: lack of transparency and lack of industry uniformity in services and policies. ISPs in Asia and the Pacific have cited the pricing of international leased-line circuits for Internet connection, as well as the "port" charge by major U.S.-backbone providers to non-U.S. ISPs, as subjects that require mutually agreed frameworks. As traffic flows begin to shift from content that is U.S.-centric to more balanced U.S./Asian content (and indeed multiple primary locations for content), the current structure appears even more inequitable. This alteration in the dynamics of traffic will drive change—some of it incremental (changing rates for interconnection) and some of it more radical (such as the emergence of new global IP carriers such as Global Crossing or Project Oxygen).

Lack of Effective Mechanisms to Discuss Global Internet-related Policy Issues That Need Clear Resolution

This third kind of barrier is less technical and more institutional or social. As networks become increasingly interconnected and the scope of services expands, inter-network coordination will become more important. The Internet as it is currently configured could not support existing switched telephone traffic. The current network that does support this traffic has been carefully developed over many years, with the International Telecommunication Union (ITU) providing centralized technical, interconnection, and financial relationship support and standards.

The Internet Engineering Task Force (IETF) and its committees have been able to deal with most Internet issues to date. As these issues become less purely technical and more commercial in nature, however, the IETF's role will need to be complemented. As with IANA domain name and number issues, the lack of an effective global mechanism to discuss and reach consensus among the diverse stakeholders is hindering the further development of the Internet. With major financial fortunes at stake, the driving issues are likely to be other than technical.

Other Barriers

The working group also noted that potential computer-related failures at the beginning of the year 2000 (the so-called Y2K problem) could have negative effects on the growth of the Internet and could be a potentially serious reliability problem. Many old models of routers, for example, may not be Y2K compliant, and the additional cost requirement of investment might constrain network functionality.

Similarly, the transition from IP Version 4 to Version 6 (which is required to expand the IP address space to allow more users to connect to the network and provide for a broader range of services) might impose a major challenge for the smooth and stable operation of the Internet. In fact, this transition is not expected to occur at all smoothly because there is no centralized coordination regarding when or how exactly to do it (users and networks both have to make changes to utilize Version 6). If some systems fail to

operate, or interoperate, properly—as is likely with the lack of centralized control and coordination—the network as a whole will have decreased reliability at the very time it is being asked to support new and more complex traffic.

New traffic types will place new demands on networks and major new demands on how these networks interoperate.[7] Although it may be possible to provide quality service on a network that one operator controls, how does that operator ensure that the next operator's network will perform in the same manner? This quality of service (QOS) issue is complicated by the nature of packet-switched traffic and the multiple traffic types supported by the Internet, as well as the architecture of a network made up of numerous interconnected provider networks (the "network of networks").

Unpredictable traffic loads and types further complicate the QOS issue and demand planning and coordination. In the traditional telecommunications environment, the ITU Consultative Committee on Telegraphy and Telephony (CCITT) provided this function. There have been no globally consistent standards to define QOS; this lack of standards or a clear process to define them is a potential barrier to the Internet's growth and broader acceptance.

Recommendations For Action

Based on the foregoing discussion, the network group members developed action items and recommendations that require international coordination and supporting mechanisms. Group members first examined the local broadband access issue and concluded that there is little area left for international coordination other than standardization activities. Standards will lead to a broader base of manufacturers and faster product deployment. The Universal Advanced Digital Subscriber Line Working Group (UAWG) is an example of an industry-led standards effort. A telephone industry consortium created by three computing giants—Compaq Computer Corporation, Intel Corporation, and Microsoft Corporation—to push faster Internet access, UAWG has gotten support from numerous U.S. local carriers.

The working group identified several other items that require substantial international coordination activity:

- *Expedite technology solutions.* The working group agreed to recommend that key technology solutions in support of Internet growth be expedited. The transition from IP V.4 to V.6 and Y2K issues have the potential to become areas of significant concern. The group noted that content caching (keeping copies of Web pages local to the end user who is accessing them to improve performance and reduce network traffic) may require international coordination in the area of intellectual property rights (IPR), especially where there is commercial value in the content. The group members did not consider the technical issues and benefits of caching to be a concern, however. The group did not make a recommendation regarding the organization or organizations that should be in charge or the kind of mechanism that should be pursued to address these issues.

- *Create international QOS standards.* The working group pointed out that there is a need to define an international standard of QOS for Internet services. This process will entail defining not only the functional standards for Internet products but how interconnected networks will cooperate to deliver them. For high-speed local access, xDSL modems and cable modems will also benefit from international coordination for standardization. Again, the group did not recommend the bodies to coordinate these services; in the later plenary session, however, participants noted that the ITU or IETF could perform these functions.

- *Create an international discussion forum on Internet policy-related issues.* The working group agreed to strongly recommend the creation of a new international discussion forum to deal with Internet policy-related issues. The experience of the IFWP with regard to the creation of a new IANA-like entity to handle the domain name system

management, IP address, and network protocols is a good lesson. This kind of forum might operate under the following principles:

1. private-sector driven;
2. open, fair, and inclusive process;
3. minimal qualification requirement;
4. minimal government participation; and
5. wide regional diversity.

The working group also agreed to recommend that all procedural resolution bodies should reflect the Internet's adaptability and bio-dynamics. As participants had noted in the plenary session, the Internet is a rapidly evolving and adapting environment, so any regulatory or resolution bodies should be adaptive rather than fixed in their approach or agenda. The model might be similar to that of the IFWP, with appropriate modifications to reflect the technical requirements of the new Internet.

The IFWP's success can be related to its limited function. The IFWP steering committee chose to concentrate on providing an open platform upon which the policy issues can be discussed—but not to make the policy itself. On the other hand, however, the lack of clear procedures for decision making and criteria to participate on the IFWP steering committee resulted in a certain degree of confusion.

The working group also discussed the following issues but did not reach any concrete recommendations:

- Procedural transparency for peering arrangements, including cost allocation issues. This transparency will be needed in an environment of broadband and QOS-based products;
- Liberalization of Internet telephony worldwide and appropriate public switched telephone network (PSTN) interconnection arrangements;
- Long-term uniformity of minimal regulation; and
- Minimal regulation of new application and services, including asymmetric regulation.

The working group found that with the exception of the Enhanced Service Providers exemption on access charges by the

FCC, there are few, if any, pro-Internet policy in the United States, Europe, or elsewhere in the world. A key conclusion reached by the working group is that the best way to support the growth of the Internet is through minimal (or no) regulation.

Working Group on Commercial Transactions and Electronic Commerce

The Working Group on Commercial Transactions and Electronic Commerce considered electronic commerce issues in the context of recommendations put forth at the 1997 AIRIT meeting, taking into account issues raised in other international forums dealing with e-commerce (such as the WTO and the OECD). Generally, the working group agreed that e-commerce must be considered in a global perspective and that it will require concerted international action by private and public actors to develop effectively and properly within the global economic context.

At the same time, the members of the working group believe that work on e-commerce issues is maturing. Consequently, there may be less need now to give e-commerce special treatment as compared to commerce generally. Increasingly, rules for e-commerce will simply be rules for commerce. Nonetheless, the working group identified some overall objectives for e-commerce and recommendations for action.

Objectives of Electronic Commerce

Electronic commerce should be led by the private sector in the context of a competitive, market-driven environment. If e-commerce is to be part of a government initiative, the government should support the private sector in the development of commercial electronic commerce activities. This consideration is particularly true in the case of many developing nations, where governments may need to take such initiatives to help initiate e-commerce activities.

Electronic commerce has the potential to increase global productivity and economic activity; therefore, businesses, governments, and consumers should work together to build trust and confidence in e-commerce among buyers and sellers. This trust is a function of commercial confidence (the parties in the transac-

tion will support their commitments in a lawful manner) and confidentiality (my personal information will not be provided to others without my knowledge or consent).

Governments should create supportive, predictable, and consistent legal/regulatory environments that take into account the specific context of electronic commerce. Because of the Internet's transnational nature, such an approach means taking into account international ramifications. Regulation of e-commerce should be no more burdensome than regulation of conventional commercial transactions.

Recommendations For Action

The working group recommended international market leadership by industry-led groups, facilitated by governments and intergovernmental organizations, to:

- develop a "Uniform Commercial Code" for e-commerce contracts (with governments taking steps to recognize these standards). Policymakers should consider the current work that is being done to draft an Article 2B of the existing Uniform Commercial Code (UCC), which would deal with information products.
- develop mechanisms for implementing trusted relationships between parties, such as authentication (with governments setting minimal standards for private-sector trust organizations such as certification authorities).
- encourage current and prospective trade/industry associations to promote public education on e-commerce issues and to act as clearinghouses and coordinating bodies. With regard to the issues of trade and industry associations acting as clearinghouses or coordinating bodies, participants wondered whether there was a global e-commerce trade association that might play a leadership role on such activities. One participant suggested that the International Chamber of Commerce might expand its role in this area.

The working group recommended government-led international action to:

- encourage nations to open their markets to e-commerce (in the WTO context) or to improve trade rules commitments, or both. The process of encouraging nations to open their markets to e-commerce might begin specifically with having them open their telecommunications markets more. A few participants mentioned that this market-opening could be made a priority during the next round of WTO negotiations. One participant also mentioned the importance of having international organizations such as the ITU help developing nations become part of the global market.
- develop standards for the application of fair competition and taxation rules, nationally and through international organizations such as the OECD and the WTO.
- create a safety net on consumer protection and privacy issues as they relate to e-commerce.

The working group did not have the opportunity to address several issues facing the industry:

- *Taxation:* The United States has recommended that no new taxes be applied in the Internet environment. Electronic commerce, however, often enables the purchaser to avoid paying sales taxes and the merchant to avoid paying business taxes. The amount of lost tax revenues exceeds a billion dollars. How does society best respond to the government need for tax revenues and the inequity of some purchasers living in the same jurisdictions paying sales tax while others do not pay sales tax simply because they have access to online sales? This issue raises the question of what is a purchaser's formal jurisdiction and how is it established and communicated. The impacts of formally identifying jurisdiction include not only taxation but consumer protection, privacy, and fairness.
- *Trust:* The issue of trust is complex. The primary dimensions of this issue are authentication (With whom am I dealing?), confidentiality of transactions, and related information (no snoopers or theft of information). Also included are concerns regarding safeguarding of intellectual property rights in a

global electronic environment; the current manifestation of this concern is software piracy.

The working group felt that the commercial issues driven by the Internet and e-commerce were manageable and that existing bodies have begun to address many of them already. Participants acknowledged during the plenary session, however, that the velocity of change in this environment has often exceeded the ability of multinational (and national) bodies to address the issues in a timely manner. The mechanisms may not exist to provide policy and legal supports for commercial developments in this new environment.

Working Group on Content and Cultural Values

This working group examined the complex areas of information content and its potential impact on cultural values. As the Internet continues to expand in scale and scope, it will increasingly affect what people see and hear. In many ways, the Internet's impact can match or exceed that of television.[8]

The issue of content in the new electronic medium addresses a wide range of media, issues, originators, and consumers. Creating an open and equitable market for content will require careful consideration of the rights and responsibilities of the different players in the marketplace. In addition, the new medium raises issues of maintenance and transmission of cultural material and control of access to sensitive, objectionable, or unwanted material. In this context, the Internet's primary objectives are to provide citizens of the community with maximum access to the widest possible legal content while protecting the rights of those who create the content to stimulate media production.

The primary barriers to achieving these objectives are the complexities of transborder information flows and the jurisdictional issues these information flows raise, along with the absence of international legal and regulatory structures to support these flows and adjudicate conflicts between parties in a timely manner. This environment is changing rapidly and attracting increasing commercial interest, yet the vast majority of the world's population remains unconnected and often unaware of the issues or their future importance.

A fundamental issue with regard to content and content availability is recognition of the importance of jurisdiction in any content-related activity. Certain locations restrict certain forms of content, for example, and intellectual property rights will vary across jurisdictions. Thus, identification of the jurisdiction of origin and the jurisdiction of use are important data to be available to facilitate legal and appropriate use of content.

Background

The working group addressed a wide range of issues and developed a set of basic principles, all of which follow Occam's Razor (the belief that simpler is better). These principles underlie the specific recommendations that follow and represent a solid footing for future initiatives.

> *Principal 1:* There should be a reliance on nongovernmental action whenever possible. Potential actions include self-regulation by market participants or acceptable technical means such as digital signature.
>
> *Principal 2:* The subsidiary principal—governance or other action should take place at the lowest level possible. If national action will suffice, then international action should be avoided. If an industry coalition action will suffice, then activities by cross-industry independent groups can be avoided.
>
> *Principal 3:* Actions taken to identify attributes about an individual or actor (such as location or age) should identify the minimum information necessary for the purpose at hand and should, if possible, be blind to the personal identity of an individual.
>
> *Principal 4:* Where possible, activities in the electronic realm should emulate those that have been developed in the physical realm, utilizing technologies as enablers for efficiency and fairness. The electronic environment is early in its development and is undergoing rapid and multidimensional change, and bandwidth and the variety of devices connected into the Internet will expand rapidly. Thus, different and often complementary technologies (such as source and use point filtering) may be needed during this dynamic time.

Recommendations For Action

The Internet is a medium of low cost, global reach, and simple content creation and publishing. Given the Internet's vast potential, we must be mindful of the power of the medium for capturing, maintaining, promoting, and communicating/transmitting educational and cultural values. This aspect of the Internet is as important within cultures as between them, and promotional policies to encourage expanding cultural content into the electronic environment should be put in place. The community should recognize that the electronic environment will have a material impact on cultural transmission (over time, as much as TV); we should properly invest in capturing and communicating these values, making explicit promotion and preservation of cultural values within and across national/cultural boundaries.

The medium itself is part of a new global culture and a technological base of competition. Therefore, government should provide access to and working knowledge of the Internet and related technologies to student populations as early as possible. This access should be provided to educate the population about the Internet as a set of enabling tools and services, as well as for the massive content pools it embodies. Explicit emphasis should be placed on developing educational materials and content and on training teachers in the use of this new medium.

The cost of failing to educate our children is too high to ignore—including the potential of increased loss of indigenous cultural values. The working group believes that although government should realize the priority of supporting these efforts, it also should facilitate the growth of private-sector actors and encourage their contribution to this content.

To avoid the disenfranchisement of significant numbers of the global community from this new medium, the developed nations and international funding agencies should initiate a program of outreach to help promote and expand equitable access to the Internet, with the specific goal of increasing quality access to global resources and creating and transmitting local content.

Content Access

In the electronic environment, the range, quality, and quantity of media content varies widely. Much of this content will be desirable for all members of the community. Some individuals may consider some content (unrequested advertising, for instance) undesirable; other content may be inappropriate for certain members of the community (e.g., minors with regard to pornography) or restricted by the state (gambling, in some jurisdictions).

Information providers currently do not require any independent certification of identity; thus, inappropriate access to sites is possible. Moving control over access will require the use of multiple technical means, including filtering at the user interface level (e.g., browsers, although this level of access is likely to expand rapidly in coming years), network level, and source level. Source filtering will require source sites to verify that they are delivering appropriate content to an individual, which will require technical verification of status (such as age) and jurisdiction (such as domicile to ensure that local regulations are known and can be respected). Consumers should be able to have their identity attributes (in the case of pornographic sites, only age and domicile) independently certified by a trusted firm (perhaps, though not necessarily or desirably, licensed by government). Only these two data items are necessary; no personal identification need be transmitted. This certification can be accomplished by an independent authority that then presents such certification to the site upon the request of an authenticated user. This certification also must be voluntary. The content supplier could rely on this certification to verify the appropriateness of access; the absence of such certification would result in restricted access to the site or any content on the site.

The working group believes that customers must explicitly opt in and agree to receive content that will be delivered without the user's request (such as advertising). Again, identification certification will occur in numerous forms and levels of detail. Only the minimum data necessary for the transaction should be supplied. These services can be supplied in most cases by the private sector as authorized by government to provide for transnational recognition.[9]

The working group believes that this capability will be a strong enabler of content creation and movement and an enabler of com-

mercial access to content. No international agreement or body is needed to execute this capability, although bad actors or illegal content havens should be sanctioned by national and international bodies to ensure their compliance with international legal practice.

Electronic Public Access

Where information or data are made publicly available by a government agency, these data should be made available to the public electronically and at no greater cost than in the physical realm, if feasible at no cost. Governments should be sensitive to the risks of collecting and aggregating personally identifiable data; thus, identifying keys (such as identity numbers) should be suppressed from public release. OECD guidelines on personal information that can easily be identified or identified (e.g., detailed postal codes) should be respected.

Privacy

OECD rules provide a good baseline for privacy as well. The working group encourages the move of the industry and national authorities to common norms. Of particular concern is the need for a forum or process for faster dispute resolution in this area, such as arbitration. This arrangement will help ensure the increased flow of goods and services with appropriate recognition of and respect for personal information and privacy.

Intellectual Property

The World Intellectual Property Organization (WIPO) has addressed intellectual property rights since December 1996. WIPO sets minimum standards; national authorities can and have added additional protection. The working group recognizes that WIPO has not reached agreement on certain rights, such as folklore rights and databases (especially those that take and format public data and resulting protection of these data); WIPO should address these important areas quickly.

The group remained uncertain regarding the appropriate forum for international resolution of disputes on database transmission and content access control. For instance, are there

minimum protections upon which there should be global consensus? How should we handle spamming, especially across borders?

There was discussion in the plenary session about the need for the public sector to promote content of an educational or cultural nature; indeed, some participants recommended explicit funding for such initiatives to help instill public confidence in the positive educational nature of the network. Due to the technical and cultural complexity of these issues, this area requires careful thought and tight international coordination.

Conclusions

In an environment as dynamic and complex as the Internet, it is difficult to expect agreement on major issues. Yet Roundtable participants largely agreed on all of the major issues in each of the three areas. Because of the newness of the environment, participants understood that there is no single answer. The wide-ranging and vast experience that AIRIT participants brought to the table afforded the group good perspective on the issues and the changing environment. This perspective was valuable in helping to determine what was new enough to demand nontraditional approaches and what could fit, at least to some degree, within existing frameworks.

Unlike other AIRIT meetings that have focused on some of the more mechanical dimensions of the Internet (such as settlements and interconnection issues), this meeting dealt with multi-faceted issues that relate not just to the new medium, but also to its impacts on society and commerce. The recursive nature of the issues discussed led the group to some conservative and not-so-conservative general thoughts:

- Where possible, use existing procedures and forums. The Internet may be new, but the issues may not be unique. This perspective was particularly applicable in the area of commercial contracts and agreements.
- Work to adapt existing forums to deal with the rapid velocity of change. Utilize forward-looking approaches to define issues, to avoid "solutions" that may hamper future developments.

- The growth of e-commerce means that international and national technical, legal, fiscal, and commercial issues need to be addressed.
- Utilize the private sector where possible, but understand the limitations of the market. There is a lot of money at stake, and there is competition between existing players and new entrants. The battles will be fierce, and the best outcome for society may not be the one that benefits any single player the most.
- Utilize government to help promote activities where the private sector leaves important gaps. In the same way that government funding started the Internet when no commercial provider was interested (indeed, many stayed far away from what was then a low-level data network), some activities—such as cultural enrichment and education—need to be seeded by or receive long-term support from government.
- The Internet will change and then change again, and policy made on the basis of the Internet as it is today will be incomplete. Any policy formulation must assume change and hence plan in a flexible and forward-looking manner.
- The impact of broadband, the impact of new global carriers, and the impact of information warfare must all be considered.

Virtually all of the participants articulated the power of the new medium to effect change outside of communications. This concept was largely responsible for the richness of the exchanges and the complexity of the recommendations. We are not dealing with regulating or promoting a new communications network; we are dealing with the policy implications of a medium that affects and may even transform many—perhaps all—aspects of our life and culture. This impact is the ultimate source of the complexity of the issues discussed and the recommendations tendered.

Endnotes

1. The Internet today is in some ways only prelude to the larger "Internet" under discussion; all of the discussions considered the near-future Internet.

2. "We grew up unregulated, and see how wonderful the Internet is? Now leave us alone."

3. These concerns were classified as infrastructure issues in working group discussions.

4. Some defenders of Internet pornography argue that the content is available elsewhere.

5. 1 megabit/second or higher.

6. A hot Web site can quickly generate billions of bits of traffic flow.

7. For example, guaranteed-quality voice is a new traffic type on the Internet.

8. The recent jamming of Web sites during the bombing of Yugoslavia is a jarring example. During the Spring 1999 NATO bombing of Yugoslavia, U.S. based Web sites with information on the war were flooded with false requests to cause the servers to slow and often block access. In this war, information was a key component, and the Yugoslav government wanted to control all forms of information access for their citizens.

9. In some cases, legal jurisdictional status might have to be government certified initially.

APPENDIX

The Fourth Annual Aspen Institute
Roundtable on International Telecommunications

Conference Participants

September 21–24, 1998
Shonan Village Center, Japan

Izumi Aizu	Principal Asia Network Research Malaysia
Walter S. Baer	Senior Policy Analyst Rand Corporation United States
Jeremy Beale	Policy Analyst and Administrator Organization for Economic Cooperation and Development France
Glee Harrah Cady	Senior Director Technology and Public Policy ICG Communications, Inc. United States
Charles M. Firestone	Executive Vice President Policy Programs The Aspen Institute United States
Michael J. Kleeman	Vice President The Boston Consulting Group, Inc. United States

Note: Titles and affiliations are as of the date of the conference.

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Juzar Motiwalla	CEO Kent Ridge Digital Labs Singapore
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Note: Titles and affiliations are as of the date of the conference.

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Robert Pepper	Chief Office of Plans and Policy Federal Communications Commission United States
Bill Poulos	Director Electronic Commerce Policy EDS United States
Leland Schmidt	Vice President Industry Affairs GTE Telephone Operations United States
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George Yong-Boon Yeo	Minister for Information and the Arts Second Minister for Trade and Industry Singapore

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About the Author

Michael J. Kleeman is an independent consultant in the high technology area and a principal at Communications Planning, a firm specializing in Internet and communications strategy. Kleeman has served as advisor and executive with numerous technology companies in Northern California including vice president at The Boston Consulting Group and director of telecommunications at Arthur D. Little–Sprint. At Sprint, he co-founded the International Services group and helped facilitate the integration with Telenet after the GTE acquisition of Sprint in 1983. His consulting experience includes work in telecommunications and information systems related business strategy (including multimedia and convergence activities), technology design, and related economic analysis. In addition to technology related firms, Kleeman has also worked in the entertainment, health care, utility and government markets. The core focus of his work has been on the use of appropriate (including leading edge) technology in business. He has also worked in areas of mergers and acquisition, due diligence, and regulatory review and testimony and has been affiliated with the Aspen Institute Roundtable on International Telecommunications, advised numerous national regulatory bodies and is a Fellow of the BIOS Institute in Santa Fe, NM. He serves on the Board of Governors of the American Red Cross and the Board of TRUSTe. He holds an MA from the Claremont Graduate School, and an undergraduate degree from Syracuse University.

The Aspen Institute Communications and Society Program

The overall goal of the Communications and Society Program is to promote integrated, thoughtful, values-based decision making in the fields of communications, media, and information policy. In particular, the Program focuses on the implications of communications and information technologies on democratic institutions, individual behavior, instruments of commerce, and community life.

The Communications and Society Program accomplishes this goal through two main types of activities. First, it brings together leaders of industry, government, the nonprofit sector, media organizations, the academic world, and others for roundtable meetings to assess the impact of modern communications and information systems on the ideas and practices of a democratic society. Second, the Program promotes research and distributes conference reports to decision makers in the communications and information fields, both within the United States and internationally, and to the public at large.

Topics addressed by the Program vary as issues and the policy environment evolve, but each project seeks to achieve a better understanding of the societal impact of the communications and information infrastructures, to foster a more informed and participatory environment for communications policymaking, or to promote the use of communications for global understanding. In recent years, the Communications and Society Program has chosen to focus on the issues of Internet policy, electronic commerce, information literacy, digital broadcasting, international and domestic telecommunications regulation, the role of the media in democratic society, and the impact of new communications technologies on democratic institutions and practices.

Charles M. Firestone has served as executive director of the Institute's Communications and Society Program for nearly 10 years. In 1998, he was also named the Institute's executive vice president for policy programs and international activities. In this

role, Mr. Firestone oversees the Institute's portfolio of 17 policy programs and guides the Institute's relationships with its international partners in France, Italy, Germany, and Japan. Prior to his position with The Aspen Institute, Mr. Firestone was director of the Communications Law Program at the University of California at Los Angeles and an adjunct professor at the UCLA Law School. Mr. Firestone's career includes stints as an attorney at the Federal Communications Commission, as director of litigation for a Washington, D.C. based public interest law firm, and as a communications and entertainment attorney in Los Angeles. He has argued several landmark communications cases before the United States Supreme Court and other federal appellate courts. Mr. Firestone holds degrees from Amherst College and Duke University Law School, and is the editor or co-author of seven books, including *Digital Broadcasting and the Public Interest* (The Aspen Institute, 1998) and *Television and Elections* (The Aspen Institute, 1992).

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